



**GETTING FOSSIL
FREE FROM
DIFFERENT
PERSPECTIVES –
TWO EXAMPLES**

Johanna Lindén
2023 02 01

FUTURE ENERGY SOLUTIONS

INNOVATIVE BURNER TECHNOLOGY



Wood powder burner 16 MW

Business:

- Energy solution provider
- Expertise within flame combustion
- Fuels: solid, liquid, gaseous

Deliveries:



- Burners with control systems, 2-50 MW
- Full turn key deliveries for energy plants, including fuel systems, boilers, flue gas treatment etc

The deliveries are tailor made and match the customer needs

Customers:

- District heating, Waste to Energy plants, Manufacturing industry, etc

Location:

- Gothenburg and Floda, Sweden
- Harelbeke, Belgium 
- Haapavesi, Finland 
- Service engineers located close to customers in Sweden

COMBUSTION SOLUTIONS – PETROBIO DESIGNED BURNER PRODUCTS

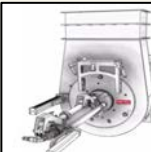
- **PETRO Low-pressure Air Atomising**
- **PETRO Rotary Cup**
- **PETRO Lance**
- **PETRO Pulverised Bio Fuel**



Oil and gas
2 - 25 MW



Oil and gas
9 - 50 MW



Oil and gas
2 - 50MW



Pulverised wood fuels
2 - 40 MW

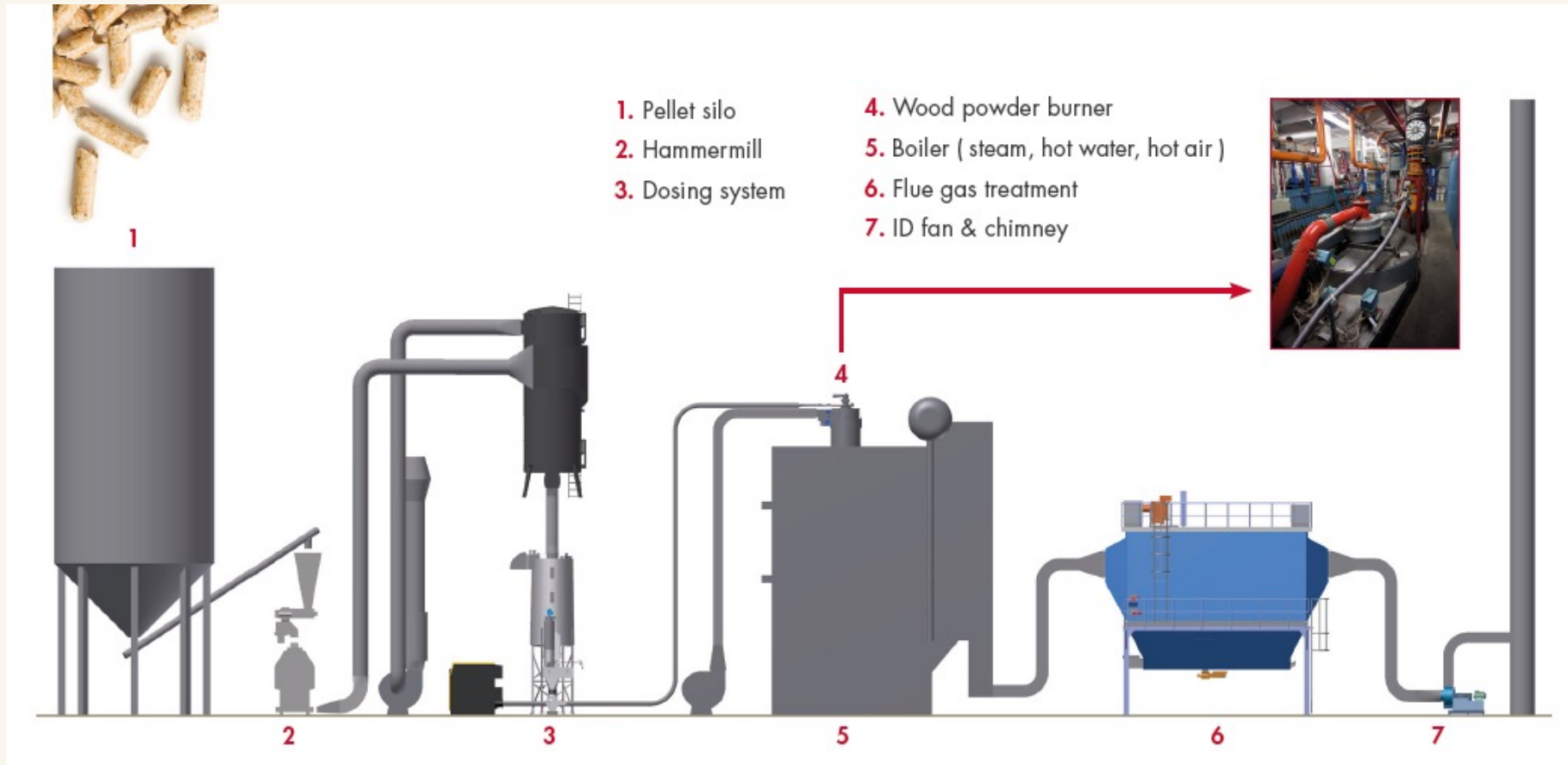


**Burner Management System
SCADA**



PETROBIO COMBUSTION SOLUTION PROVIDER

Wood Powder System



60 PetroBio installations with wood powder application

- 1/3 greenfield solutions
- 2/3 retrofits
- 4 - 56 MW
- HW and Steam
- District Heating and Industry

REFERENCE VISIT TODAY: VGR ALINGSÅS TVÄTTERI, ALINGSÅS

Laundry, Sweden



Fuel storage and
milling house



Mono Block version, horizontally mounted

Type: Steam boiler, base load,
fluctuating energy need
Fuel: Wood Pellets
Secondary fuel: Gas (LPG)

Project;

2013: Conversion of a 6,5 MW industrial
steam plant from heavy fuel oil to pulverised
wood firing.

Time schedule, conversion; 6 months
from contract signing to take over

Supply; Fuel reception, fuel storage, fuel
milling, burner, boiler modifications, flue gas
cleaning, electrics and controls, mechanical
erection

TWO DISTRICT HEATING PLANTS - TWO REASONS FOR FUEL CONVERSION



Present Fuel: Natural Gas
Future Fuel: Pellets (Oil, Gas)

Type of project: Boiler conversion, x2
Reasons for rebuild: Political, Environmental, Economical

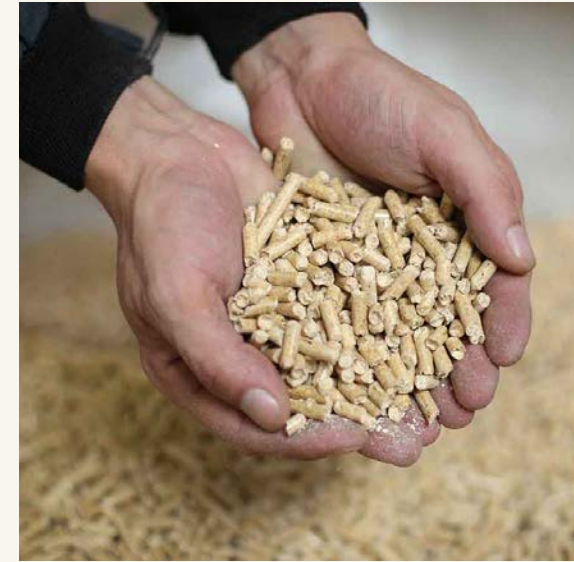
Capacity: 2 x 8 MW
Start up 2023



Present Fuel: Natural Gas
Future Fuel: Pellets (Gas)

Type of project: Boiler Replacement, x2
Reasons for rebuild: Environmental, Logistic

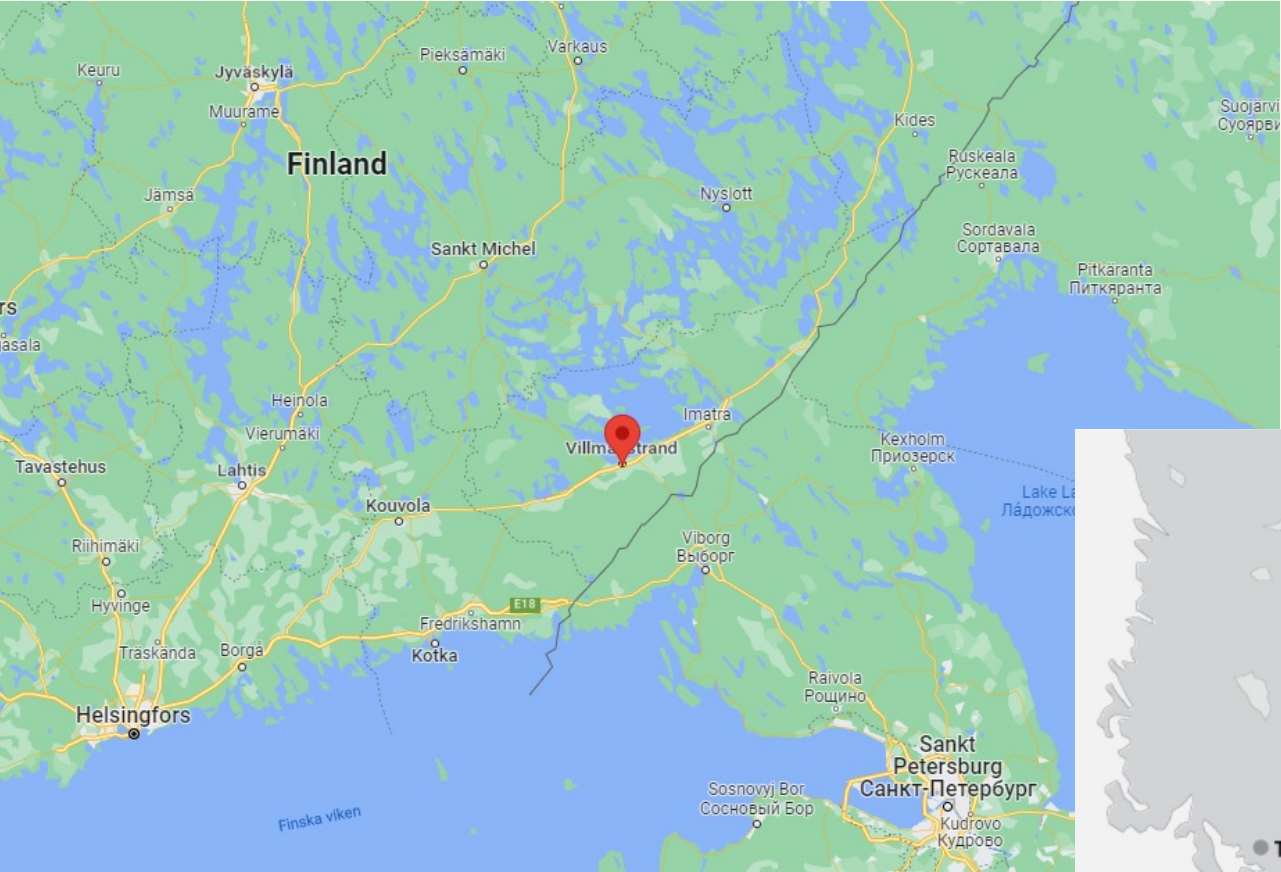
Capacity: 2 x 8 MW
Start up 2023



Two examples of pellet fired plants:

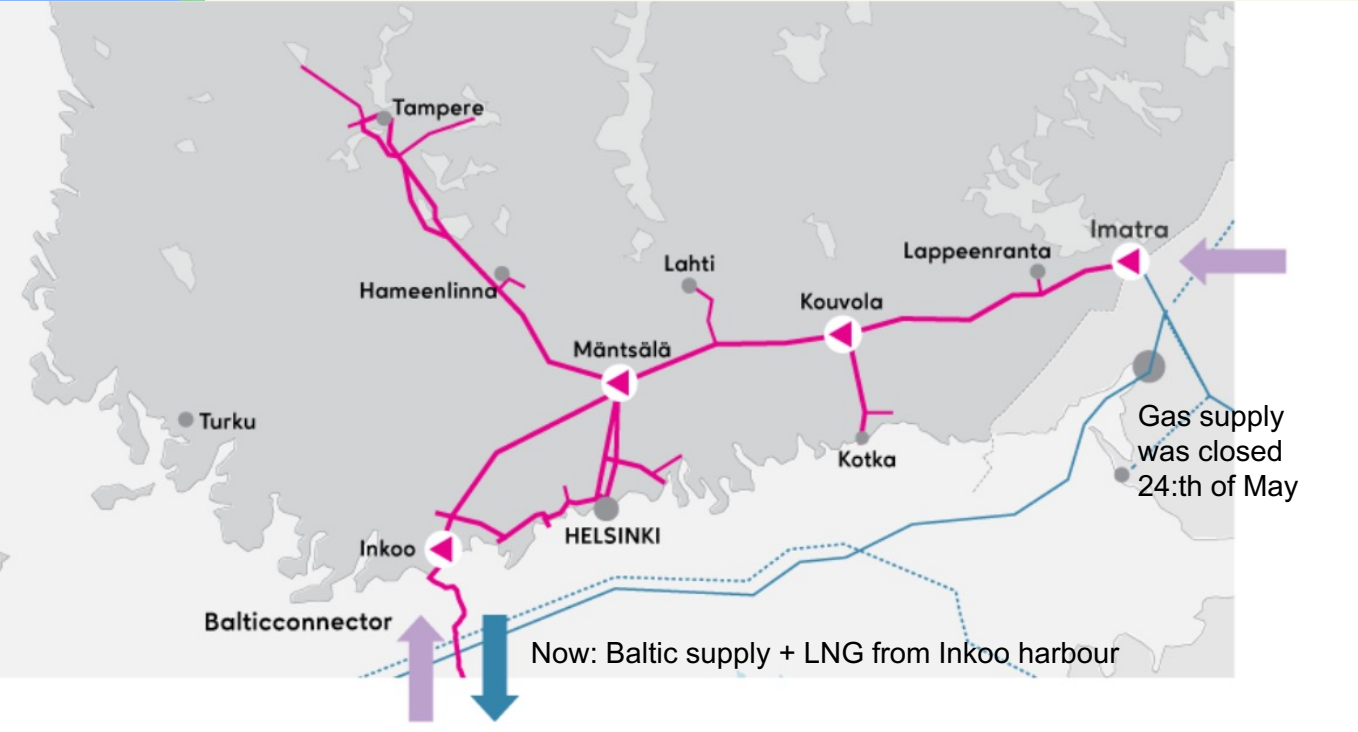
- Different reasons for project development
- One boiler retrofit project
- One new boiler project
- Two different PetroBio cooperation partners

LAPPEENRANNAN ENERGIA – THE FUEL SUPPLY CHALLENGE



LAPPEENRANNAN ENERGIA OY:
Local energy company, with several sites around the city of Lappeenranta (Villmarsstrand)

Lappeenranta (Villmarsstrand) location: about 7 km from Russian Border



LAPPEENRANNAN ENERGIA PROJECT BACKGROUND

Feasibility study and aim:

- Lower the district heating cost production
- Become independent of imported fuel (has become even more important!)
- Become fossil free

Several sites were investigated, and **District Heating Central Ihalainen** were selected to be a subject of gas boiler conversions

Fuel, after conversion:

- Local sourcing of wood based fuel (Pellets)
- Oil and gas will act as ignition / secondary fuel

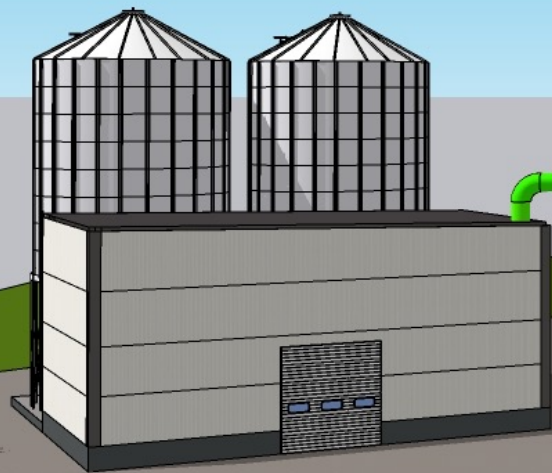
Project:

- Initiated spring 2022, as a cooperation project between CTI and PetroBio
- Start up, after conversion: Summer/autumn 2023

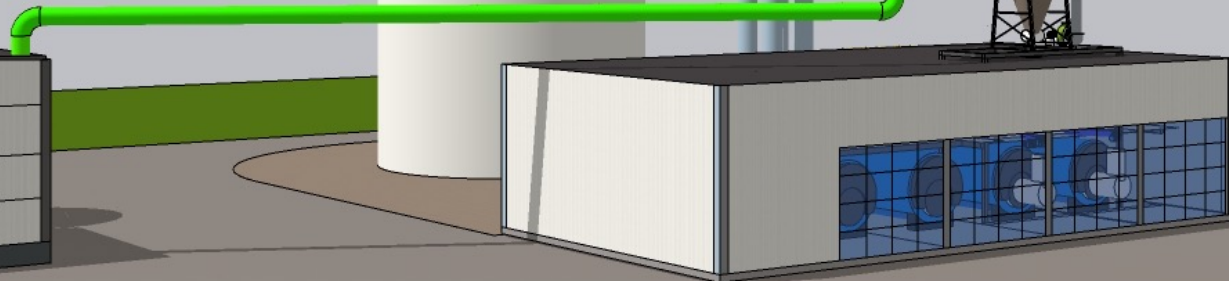


LAPPEENRANNAN ENERGIA CONVERSION PROJECT

2 X 500 m³ Silos

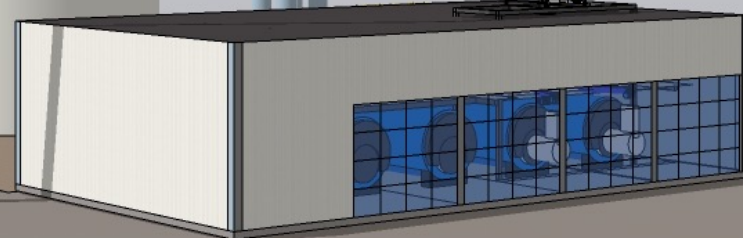


Hammer mill equipment (CPM)



2 x Flue Gas cleaning (Scheuch)

Air separation



LAPPEENRANNAN ENERGIA CONVERSION OF TWO GAS BOILERS

Boiler Modifications:

- Boiler front modification
- Replacement of finned economiser to plain tube
- Installation of soot blowing equipment



Ahlstom Boilers, Natural Gas origin

PETROBIO PETRO COMPACT ECOFLAME SYSTEM - PCES

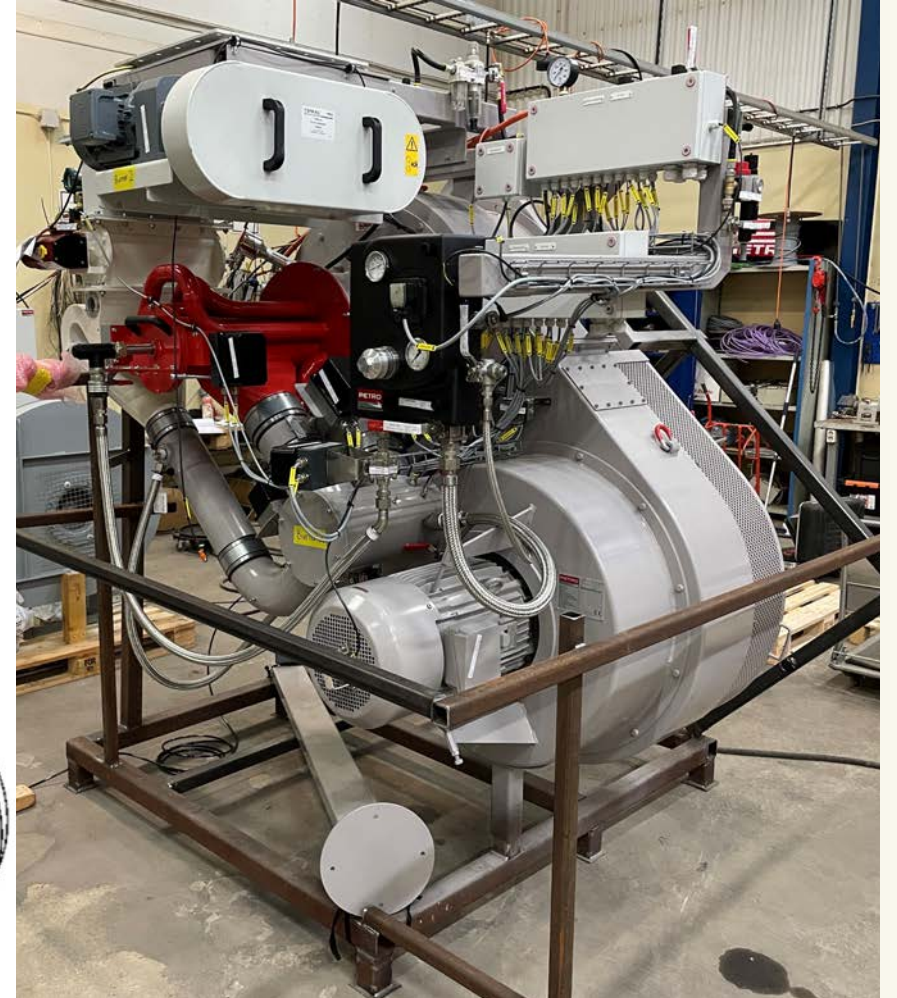
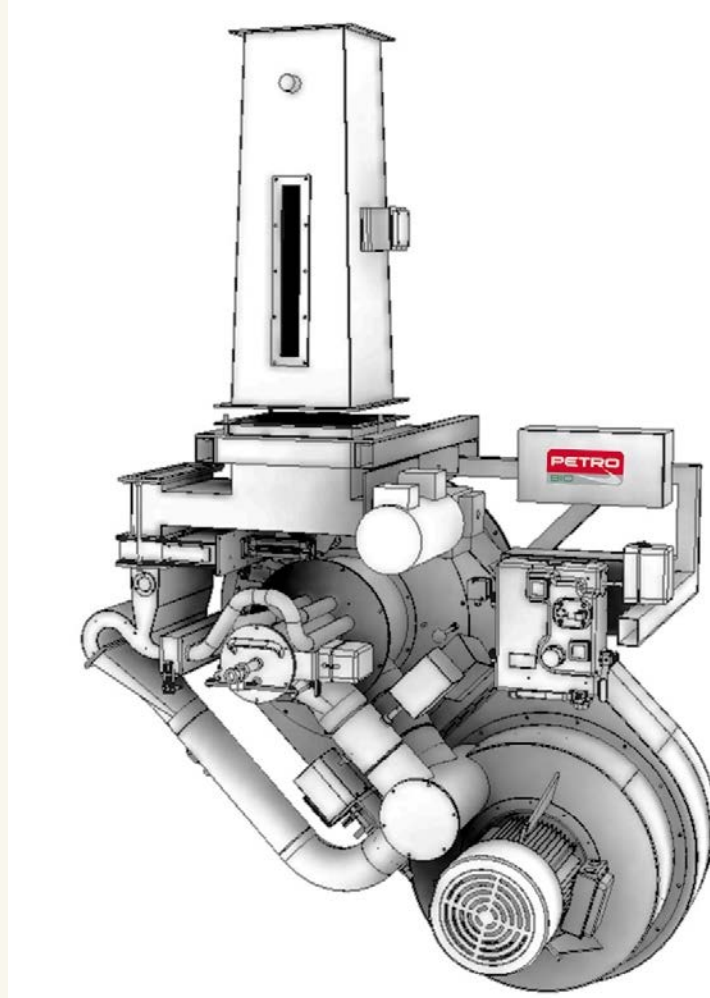
New pulverised fuel burners:

- 8 MW Multi Fuel capability (wood powder / oil / gas)
- Dosing integrated in burner unit (compact design)
- Fan integrated in burner unit (compact design)

Pre-assembled and FAT tested in PetroBio workshop

PetroBio control system application, Siemens based

Flexible secondary fuel selection (9MW):
Oil or Gas

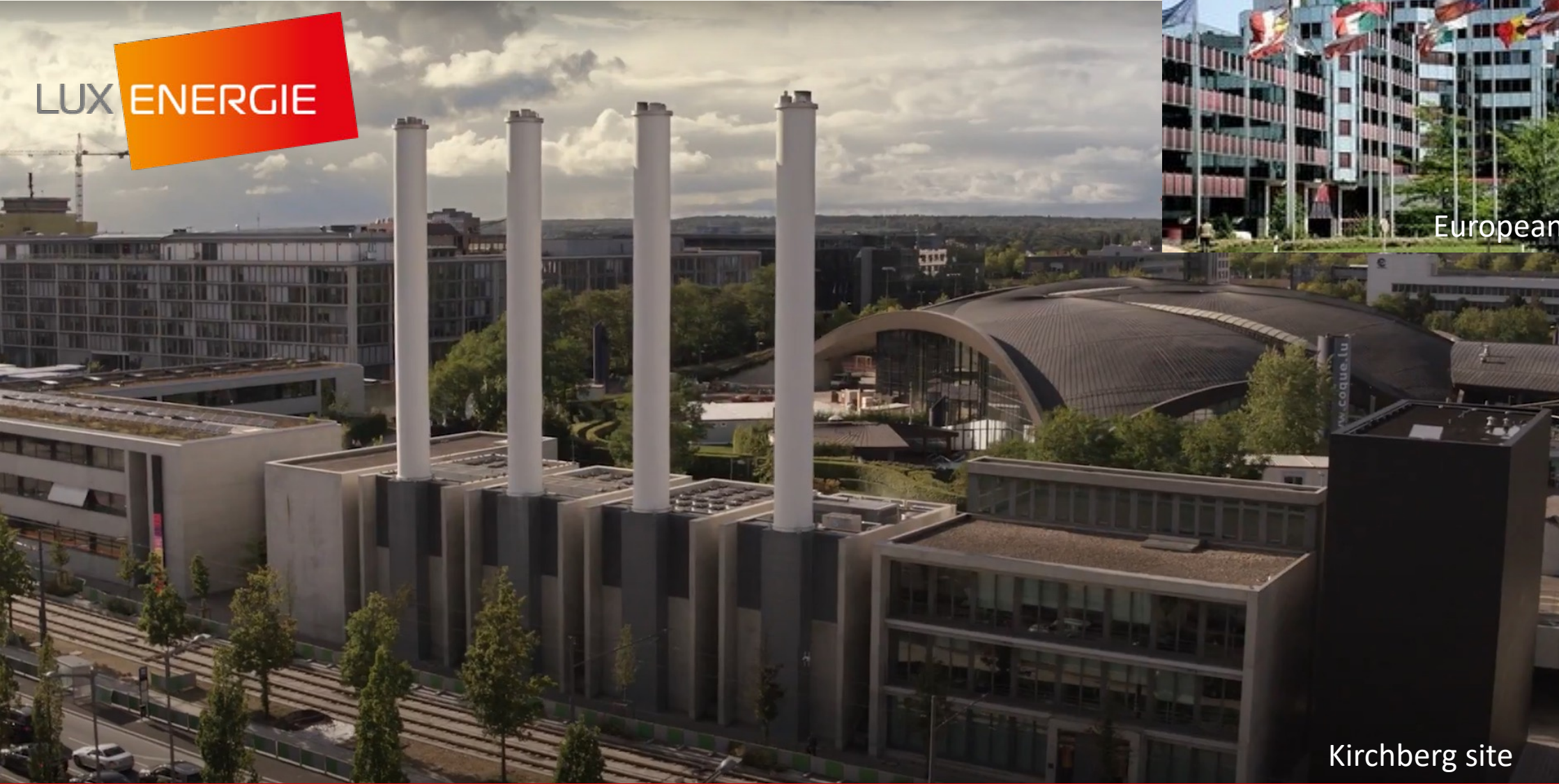


BRRR – IN NEED OF ENVIRONMENTAL, INDEPENDENT DISTRICT HEATING!!



Site picture, January

LUX ENERGIE – THE CITY CENTER CHALLENGE



LUX ENERGIE



550 m from site

European Parliament

Kirchberg site

LUX ENERGIE – THE CITY CENTER CHALLENGE

Kirchberg site:

- Built 2001
- Origin energy central with natural gas CHP units and fossil boilers
- When heat demand increased and additional pellet fired VYNCKE CHP boiler (12,5 MW) was built 2017, covering the base heat load
- Now: next strategic move to be taken, installing 2 peak load boilers (8 MW x 2), operating with wood powder flame combustion, replacing the fossil fuel boilers at site

Project:

- Initiated spring 2022, as a cooperation project between VYNCKE and PetroBio
- Start up, after conversion: Autumn 2023



LUX ENERGIE – KIRCHBERG SITE

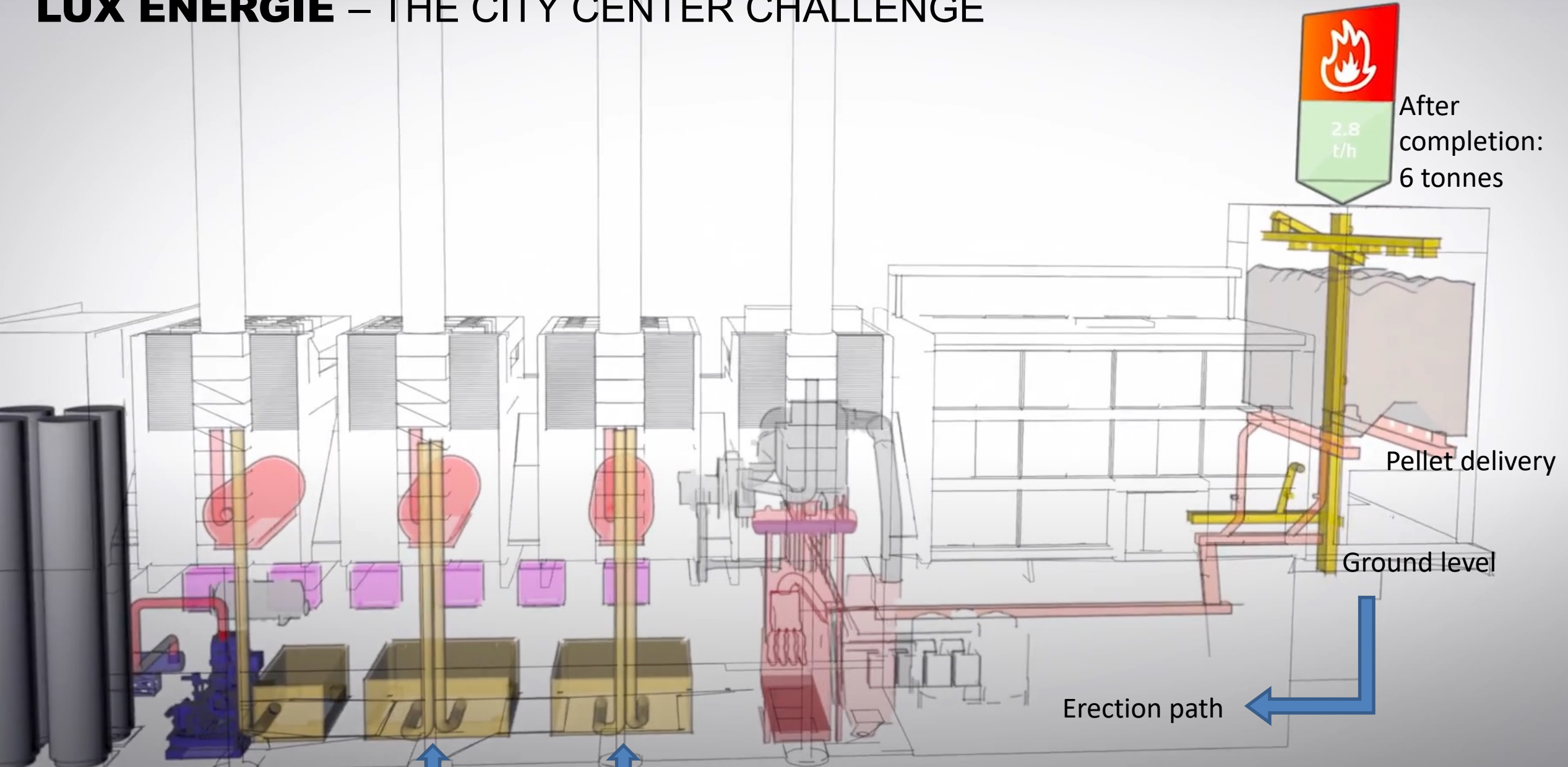
Boiler house

Office and control room

Pellet delivery

City Tram

LUX ENERGIE – THE CITY CENTER CHALLENGE



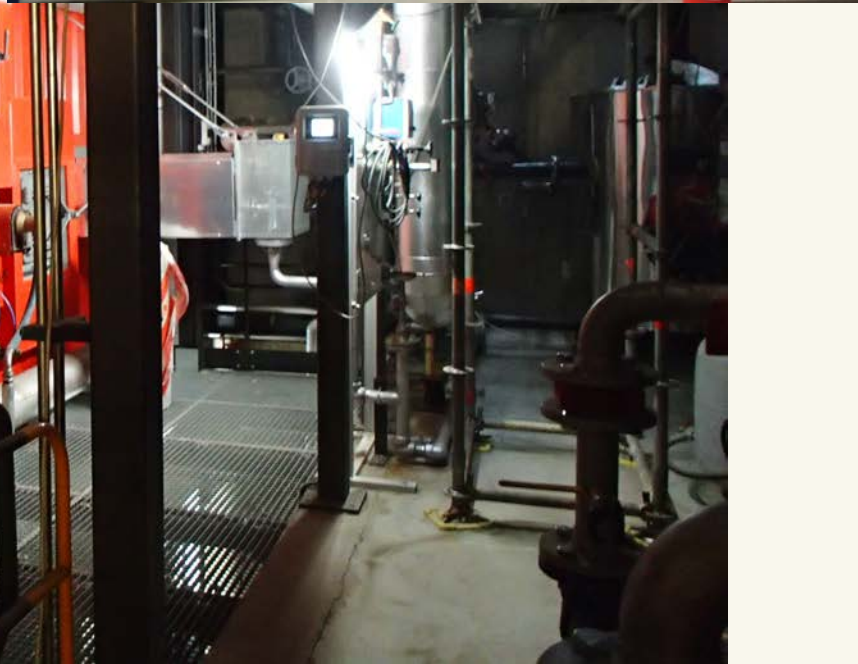
PETRO BO

To be replaced

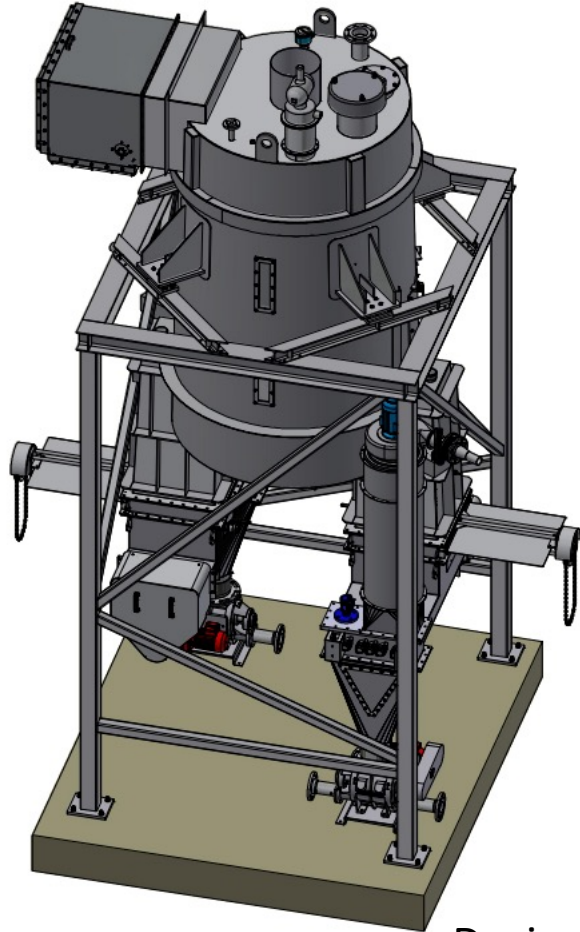
ERECTION OPENING



CONFINED SPACES



ERECTION CHALLENGES



Dosing unit

Site adoptions:

- Dismantle of present grate boiler equipment
- Special adaption of parts
- Final erection of equipment parts done at site – preassembly not possible
- Accurate erection planning needed – most of the work is done during operation of the rest of the plant

Hammer mill: CPM

Boiler design: VYNCKE

Dosing: TOMAL / PetroBio

Burner and controls: PetroBio

Flue gas filter: Scheuch

Cooperation project: VYNCKE + PetroBio

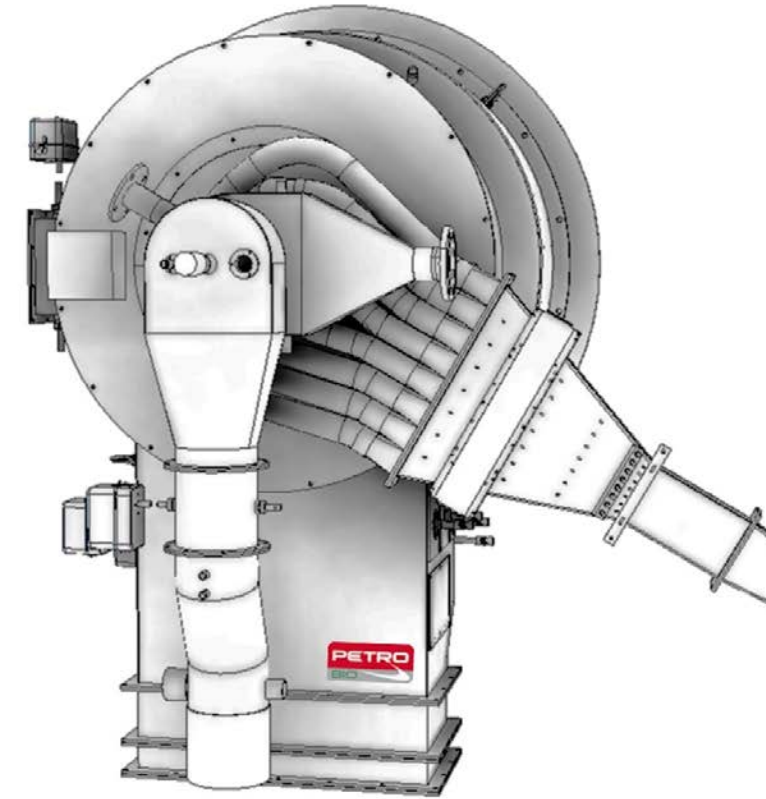
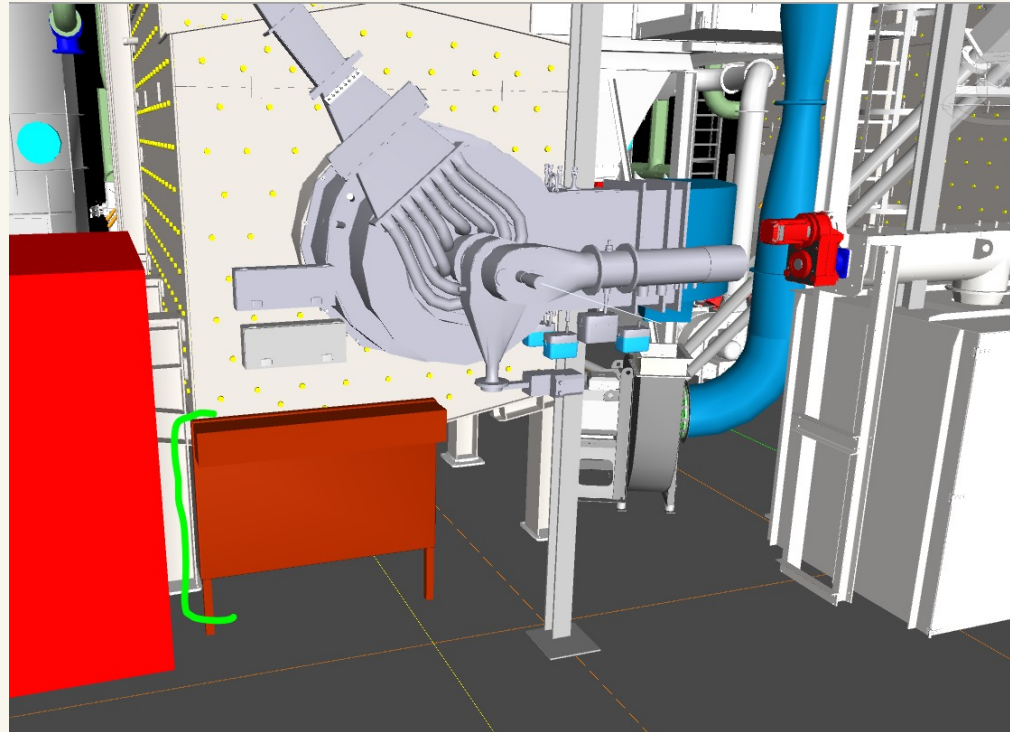
PETROBIO PETRO POWDER ENERGY SYSTEM

New pulverised fuel burners:

- 8,3 MW Multi Fuel capability (wood powder / gas)
- Dual block design

Pre-assembled and FAT tested in PetroBio workshop

PetroBio control system application, Siemens based



EVENING IN LUXEMBOURG WITH FOSSIL FREE HEAT

AND PROBABLY THE MOST BEAUTIFUL PELLET SILO IN THE WORLD...



TWO DIFFERENT REASONS – TWO DIFFERENT SOLUTIONS



**WAR, POLITICS, CARBON FOOTPRINT, FUEL AVAILABILITY,
LIMITED SPACE, CITY CENTER CLOSENESS...**

The reasons to chose a pellet fired solution are many...



Thank you for your attention

Johanna Lindén

CEO

Johanna.linden@petrobio.se